they had never had a mentor.[5] In the sample studied by Levinson and co-workers, minority women were even less likely than their white female colleagues to have the benefit of a mentor.

Because a mentor could be either male or female, the small number of women in senior positions who could serve as mentors theoretically does not preclude more junior women from obtaining mentoring. In truth, the scarcity of high-level academic women as mentors is problematic. First, male faculty may be less likely to develop a mentoring relationship with a female student or junior faculty member than with a male. One motivation for senior faculty of developing a mentoring relationship may be the sense of reproducing oneself. In selecting a protégé, faculty members may, without their own awareness, lean towards selecting persons who are of the same sex and race. The bias toward selecting a protégé who is similar to oneself (beyond a similarity in area of academic interest) works against women and minorities.[6] Further, insofar as male faculty may think that women will be less likely to succeed in academic careers, they may shy away from taking them on as protégés. This can become a self-fulfilling prophecy if women then do not have access to the information and help that a mentor can provide.

These processes are subtle. As Menges and Exum note in reviewing barriers to the advancement of women and minority faculty in academia, "slow progress is less the result of deliberately prejudiced actions than the failure of persons of good will to ensure equity."[7(p139)] Even if the selection of protégés were equal by sex, there would still be a problem for women who had male mentors. While either a man or woman can be a mentor for a woman, only a woman can fully constitute a role model for another woman. As Levinson and associates note, while mentors provide guidance on professional issues, role models provide an example of both professional and personal life.[2] For most women, the example of other women successfully combining a satisfying personal and professional life provides critical information and motivation to aspire to a similar role.

In their study, Levinson and co-workers found a more powerful effect of having a mentor than of having a role model in terms of career success, although both were related to career satisfaction. This finding should be interpreted cautiously. First, as the authors note, the survey was of full-time faculty. A lack of role models may play a particularly strong role in the decision of women not to continue in academic medicine. In addition, the analysis compared women who reported having an ongoing relationship with a role model with those who did not.[2] Effective functioning of role models may or may not require an ongoing relationship. It may be that among those women who reported not having had an ongoing relationship with a role model were women who had previously had a role model who provided them with a positive image of the possibilities of an academic career in medicine. If this is combined with currently having a mentor, a woman may have both the motivation and the practical support necessary to persevere and succeed. In future research, it would be useful to examine the joint and separate functioning of role models and mentors and to consider the question of the nature and timing of influence of each.

Levinson and colleagues discuss possible remedies to the lack of role models and mentors for women in academic medicine.[2] These include encouragement for senior faculty to place a high priority on providing mentoring and encouraging junior women to seek out such relationships and to develop other resources, including peers, to supplement lacks in the mentoring they may receive. Unfortunately, there is reason to think that these measures will fall short of achieving the kind of change that is necessary to improve substantially the situation for women in academic medicine. The processes noted earlier may be subtle but they are nonetheless powerful. It is not enough to encourage senior faculty to mentor. There are already too many good and worthy activities that faculty "should" engage in. True incentives for such activity are needed, including considering mentoring activity as a critical aspect of merit and advancement for senior faculty. In addition, incentives are needed to help junior faculty who might not otherwise be selected as protégés. Further, there is no substitute for having a sufficient number of women in senior positions to serve as role models. To accomplish this, institutional changes are needed that enable and encourage women to stay in academic careers. This involves some change in the academic climate, which has been a "chilly" one for women.[8] Policy changes are needed to make it easier for women as well as men to combine family and career. Recent policies adopted by some medical schools to establish childbearing and family care leave, including procedures for slowing the tenure clock, are examples of policies that will help to keep women in the academic track.

Felice Schwartz has argued in the *Harvard Business Review* that women were moving into a seller's market in the corporate world ("Management Women and the New Facts of Life," January-February 1989, pp 67-76). This change was occurring because institutions were recognizing that "80% of new entrants in the work force over the next decade will be women, minorities, and immigrants" (p 68). These demographics will affect medicine as well. To get the best physicians to teach, do research, and care for patients, medical schools will need to recognize the need for women and the needs of women.

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Hypoglycemia—A Major Risk of Insulin Therapy

IN THIS ISSUE of the journal, Dr Service describes the pathophysiology, evaluation, and treatment of hypoglycemia.[1] I will focus on one of the most common causes of hypoglycemia: iatrogenic hypoglycemia secondary to insulin treatment of diabetes.

How common is hypoglycemia? Most experienced clini-

cians recognize that minor hypoglycemic reactions are extremely common in patients with insulin-treated diabetes mellitus.[2] In the randomized Diabetes Control and Complications Trial (DCCT), hypoglycemia occurred approximately once per week in the standard treatment group and approximately twice per week in the intensive treatment group.[3] Less well recognized is that severe hypoglycemia, defined as coma, seizure, a reaction requiring admission to a hospital, or intravenous glucose or glucagon therapy, are also common.[2] Basdevant and co-workers reported that during a one-year period of observation, 17% of patients had a severe hypoglycemic reaction.[4] Similarly, in the DCCT study 9.8% of subjects in the standard treatment group had severe hypoglycemia during the 12 months of study.[3] Not all studies have shown this high a frequency of severe hypoglycemia, which may be due to differences in patient populations, education of the patients, the goals of therapy, treatment regimens, or the degree of normalization of glucose levels.

Is hypoglycemia a serious side effect? Deaths due to hypoglycemia are a surprisingly frequent iatrogenic complication.[2] For example, 2.8% of insulin-dependent diabetic patients treated at the Joslin Diabetes Center (Boston, Mass) died of hypoglycemia. In other studies, between 2% and 7% of deaths in insulin-dependent diabetics were caused by hypoglycemia.[2] Brain damage due to insulin-induced hypoglycemia has unfortunately been observed by most experienced diabetologists, but the incidence of brain injury has not been carefully investigated. Whether hypoglycemia causes subtle long-term neurologic sequelae has not been definitively proved, but there is considerable evidence suggesting that hypoglycemia may have harmful consequences.[2] In a study by Golden and associates, a high frequency of hypoglycemia was associated with decreased abstract-visual reasoning.[5] The frequency of insulin-induced hypoglycemia causing motor vehicle accidents or other accidental injuries is unclear.[6] In a small survey of 250 insulin-dependent diabetic patients, 13 (5.2%) admitted that hypoglycemia had caused a motor vehicle accident.[7] Finally, the role of hypoglycemia in causing rebound hyperglycemia (Somogyi effect) continues to be debated with both positive and negative studies.[8,9]

Which diabetic patients are likely to have serious hypoglycemia? A number of medical conditions such as pituitary or adrenal insufficiency, end-stage liver or kidney disease, ethanol abuse, therapy with β-blockers, and psychiatric disturbances have been recognized to predispose to serious hypoglycemia.[2] Furthermore, as discussed by Service, there is a counterregulatory hormonal response to hypoglycemia, primarily involving the secretion of glucagon and epinephrine, that produces an increase in serum glucose levels and protects from hypoglycemia.[1] In persons with diabetes, this counterregulatory hormonal response is frequently impaired.[2] Patients with diabetes for several years have a reduced glucagon but normal epinephrine response to hypoglycemia resulting in a modest delay in glucose recovery. After a longer duration of diabetes, both the glucagon and epinephrine response are deficient, resulting in a marked impairment in recovery from hypoglycemia. In some studies a delayed or absent rise in glucose levels after experimentally induced hypoglycemia has predicted an increased risk of severe hypoglycemia with aggressive insulin therapy.[10]

Does tight glucose control increase the risk of hypoglycemia? In the DCCT study, subjects in the intensive treatment group had a threefold increase in the incidence of serious hypoglycemia compared with those in the standard treatment group (intensive treatment 26% versus standard treatment 9.8%, $P < .001$).[3] Others have also noted an increased risk of hypoglycemia in patients with rigidly controlled diabetes. In addition, studies have shown that patients with severe hypoglycemia are more likely to have decreased hemoglobin A1 levels.[11] One obvious explanation for these findings is that given the imperfect techniques of glucose control, the closer a person gets to normal glucose levels the less margin of error there is, and the more likely one is to overshoot and induce serious hypoglycemia. In addition, studies have shown that the body's homeostatic response to hypoglycemia is reduced by tight glycemic control.[12-14] The glycemic threshold for the release of counterregulatory hormones is lowered by improved glycemic control, resulting in an impairment in the recovery from hypoglycemia. Furthermore, because the adrenergic symptoms of hypoglycemia—anxiety, cold sweats, tachycardia, hunger—are caused by epinephrine secretion,[2] the early recognition of hypoglycemia is also impaired in patients with well-controlled diabetes.[14] Consistent with this observation are reports that following the initiation of intensive insulin therapy, the recognition of hypoglycemia is impaired.[15] Of great importance is that while the threshold for counterregulatory hormone release is decreased, the glycemic threshold for impairment in cognitive function is not altered by strict glycemic control.[16] Thus, tight glycemic control in addition to reducing the margin for error also induces alterations in counterregulatory hormone response that are likely to increase the risk of severe hypoglycemia.

How can serious hypoglycemia be prevented? All patients with diabetes need to be educated regarding the possible dangers of hypoglycemia. Patients need to be instructed as to the symptoms of hypoglycemia and what actions they should take if hypoglycemia occurs. Particularly important, and often overlooked, is the measurement of blood glucose levels to confirm the presence of hypoglycemia.[2] At times patients can have symptoms consistent with hypoglycemia without having low blood glucose levels.[2] In normal persons and diabetic subjects, decreases in blood glucose levels within the normal range can stimulate the adrenergic system and result in symptoms identical to those observed with hypoglycemia.[2] Alterations in therapy based solely on symptoms can lead to unnecessary and counterproductive changes. Patients on insulin therapy should always carry glucose and be strongly encouraged to wear a medical alert bracelet. Family members and close friends should be educated as to the symptoms and signs of and appropriate therapy for hypoglycemia. In persons who have had severe hypoglycemic episodes, instructing family members or close friends in the administration of glucagon can be life saving.

The potential for serious hypoglycemia should not be used as a blanket excuse to avoid improving metabolic control. Rather, one needs to balance the risk of serious hypoglycemia with the possible benefits of improved glycemic control.[2] In patients with a high risk of hypoglycemia, tight control may not be justified. A previous history of severe hypoglycemic episodes is a relative contraindication to strict glycemic control.[3] In addition, in some patients the possible dangers of hypoglycemia may be more serious—history of cardiac or cerebrovascular disease, living alone, and the like—and therefore tight glycemic control may not be indicated. Furthermore, there are patients, such as those with severe preexisting diabetic complications or a decreased life

expectancy from other medical conditions, who are unlikely to benefit from tight metabolic control, and in these patients the risk of hypoglycemia occurring outweighs the potential benefits. It is essential that physicians weigh the benefits and risks and tailor a therapeutic regimen to the needs of individual patients.

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An Agenda for Public Health in the 1990s

THESE ARE EXCITING and dynamic times in public health, preventive medicine, and health care in general. Profound changes are underway in health care services delivery. We have entered a new era of consciousness and concern about the healthfulness of the food we eat, the water we drink, the air we breathe, and the overall global environment. There are new and frightening problems before us such as AIDS and drug abuse, while long-recognized health problems such as injury control and inadequate prenatal and children's care continue to cry out for attention. And new health care technology and scientific advances in genetic engineering and other fields are presenting unprecedented moral and ethical dilemmas.

It seems as though there has never been a time when there were more challenges for public health and more opportunities for public health personnel to unite with medical practitioners and other human service professionals. While the list of issues and problems for public health to focus on is long, I think much of the public health agenda of the coming decade will focus on five particular areas.

The first of these problem areas is substance abuse. I would agree with those who have called drug abuse today's number one public health problem in California—and probably in the United States. Drug abuse is tearing apart the very fabric of society in many communities and is causing a skyrocketing increase in illness and death. Examples of this are the following:

- Surveys done by the California Department of Health Services in 1988 revealed that 20% of newborns admitted to neonatal intensive care units in California that year had problems related to maternal drug abuse. The estimated cost for the initial hospital care only of those more than 8,000 infants was more than $40 million. Indications are that this situation has not improved.
- The incidence of congenital syphilis has increased about 500% in the past five years, most of which can be related to the use of cocaine.
- The major cause of new cases of AIDS in many parts of the country, and increasingly so in California, is drug abuse. This disproportionately affects minority ethnic groups. New AIDS cases related to drug abuse are five times more common in African Americans than among other ethnic groups in California.

There are other statistics that could be cited; suffice it to say that drug abuse is causing protean untoward public health effects.

While most of the attention in recent years has focused on cocaine, heroin, and methamphetamines, we should not forget that the first drug of abuse and the first drug of addiction for our children is tobacco. We now know that tobacco is every bit as addictive as heroin or cocaine, and we should view tobacco for what it is—legalized dope. Tobacco use kills more than 40,000 Californians every year—far more than that of cocaine or heroin—and it costs California more than $25 million a day in medical expenses and lost productivity.

If we are going to wage a war on drugs, we need to begin with a war on tobacco. I am pleased that we have initiated one in California.

The second major public health challenge of the 1990s—for both California and the rest of America—is assuring the availability of access to basic health care for all of our citizens. It is ironic that whereas many Americans receive the most technologically advanced and the best medical care available any place in the world, a large and growing number of our citizens go unattended, having no or inadequate access to even the most basic health care services. This paradox of medical need amidst medical plenty has developed over many years as a result of complex and powerful forces that cannot be easily changed. But change must occur!

As a society, we should set a goal that by the end of this decade, if not sooner, *all* Americans should be guaranteed access to at least basic health care.

A third area of particular concern for public health in the 1990s will be genetics and genetic-related diseases. Genetic engineering and techniques such as in vitro fertilization and chorionic villus sampling, as well as other new and rapidly developing technologies, will have a major effect on public